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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/016,499	12/12/2001	David Akopian	944-001.056	4552

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EXAMINER
PERILLA, JASON M

ART UNIT	PAPER NUMBER
2638	

DATE MAILED: 12/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/016,499	AKOPIAN, DAVID
	Examiner	Art Unit	
	Jason M. Perilla	2638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>24 October 2005</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1,2,5-7 and 10-12</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1, 2, 5-7, and 10-12</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>12 December 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 1, 2, 5-7, and 10-12 are pending in the instant application.

Response to Amendment/Arguments

2.   The Applicant's remarks, filed October 24, 2005, have been considered, but they

are not persuasive. The Applicant suggests that Gronemeyer (US 6577271) does not

disclose multiplication by an *immediately preceding* signal fragment. However,

Gronemeyer discloses multiplication by "any previous integration values" (col. 11, lines

15-17) which includes the immediately preceding signal fragment.

Claim Objections

3.   Claim 12 is objected to because of the following informalities:

Regarding claim 12, in line 3, "the apparatus" is lacking antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 1, 2, 5-7, and 10-12 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Gronemeyer (US 6577271 – previously cited).

Regarding claim 1, Gronemeyer discloses a method for determining information

about a carrier frequency of a signal transmitted by a possibly moving transmitter, the

signal having a code component and a carrier component at the carrier frequency (col.

1 & 2; "BACKGROUND"), the method comprising: a) a step of responding to

successive approximately carrier-demodulated received signal fragments (col. 5, lines

12-15), and providing a set (fig. 11) of correlation results indicating information about

the correlation of the successive approximately carrier-demodulated received signal

fragments with phase-shifted replicas of the code component (fig. 11, refs. CP1-CPn)

and any remaining carrier component (fig. 11, refs. DS1-DSm; col. 5, lines 35-50),

wherein the successive approximately carrier-demodulated received signal fragments

are formed using different possible offsets or doppler offsets (col. 1, lines 63-68) from a

nominal carrier frequency transmitted (col. 1, lines 20-25), and further wherein each

element of the set is provided as a phasor having a magnitude and a phase (col. 4, lines

63-66; col. 6, lines 1-8); and b) a step of responding to the set of phasors, selecting the

phasor having a magnitude distinguishing it from all the other elements of the set (col. 8,

lines 15-24), and determining the phase of the selected phasor; wherein the step of

providing the matrix of correlation results includes a step of performing a coherent

integration (40) of each of a series of received signal fragments, and a step of

performing a non-coherent integration (110) in which phasor results of the coherent

integrations are combined without regard to phase (col. 11, lines 15-25). That is, only

the magnitude and not the phase is combined in step 132 (fig. 7). Because the array of

correlation hypotheses (fig. 11) is formed of real and imaginary components, or

equivalently, magnitude and phase components (col. 8, lines 10-15), the phase of the

phasor having a distinguishing magnitude is determined. Gronemeyer does not

explicitly disclose that the step of performing non-coherent integration (110) involves

multiplying each element of a matrix of correlation results by the complex conjugate of a

corresponding element for an immediately preceding signal fragment. However,

Gronemeyer discloses that the step of performing non-coherent integration includes

finding the magnitude of the current matrix correlation result by taking the sum of the

squares of the real and imaginary components of the result and adding it to the

magnitude results which have been derived for previous matrix elements to perform

non-coherent integration (col. 11, lines 15-25). As understood by one having skill in the

art, the magnitude of a phasor can be determined by summing the squares of the real

and imaginary components of the phasor, or equivalently, by multiplying the phasor by

its complex conjugate. Furthermore, Gronemeyer discloses current phasor results are

non-coherently combined with any previous values obtained (col. 11, line 16).

Therefore, the *immediately preceding* correlation result, at least, would be included in

the non-coherent combination. Therefore, the method of finding the magnitude of the

correlation result as disclosed by Gronemeyer (sum of squares) is functionally and

mathematically equivalent to the claimed method (multiplication by complex conjugate)

of the instant application, and would have been obvious to one having skill in the art.

Regarding claim 2, Gronemeyer discloses the limitations of claim 1 as applied

above. Further, Gronemeyer that the set of correlation results is a matrix of correlation

results (fig. 11), and further wherein the matrix of correlation results is spanned by an

index (fig. 11, ref. DS1-DSm) indicating an offset from a nominal carrier frequency and

also by an index (fig. 11, ref. CP1-CPn) indicating a replica code phase, and still further

wherein the selected phasor is the phasor having the maximum magnitude of all the elements of the set (col. 8, lines 15-24).

Regarding claims 6 and 11, Gronemeyer discloses the limitations of the claims as applied to claim 1 above.

Regarding claim 7, Gronemeyer discloses the limitations of claim 6 as applied above. Further, Gronemeyer discloses that the set of correlation results is a matrix of correlation results, and further wherein the matrix of correlation results is spanned by an index (fig. 11, "DS"; col. 1, line 63) indicating an offset from a nominal carrier frequency and also by an index (fig. 11, "CP"; col. 1, line 37) indicating a replica code phase, and still further wherein the selected phasor is the phasor having the maximum magnitude of all the elements of the set (col. 8, lines 15-24).

Regarding claim 8, Gronemeyer discloses the limitations of the claim as applied to claim 3 above.

Regarding claim 9, Gronemeyer discloses the limitations of the claim as applied to claim 4 above.

Regarding claim 12, Gronemeyer discloses the limitations of claim 11 as applied above. Further, Gronemeyer discloses a computing resource (fig. 6, ref. 112) external to the ranging receiver, and wherein the apparatus communicates information to the computing resource via a wireless or cellular communication (col. 10, lines 29) system and the computing resource provides at least some of the computation needed either to provide the set of correlation results or to determine the selected phasor (col. 10, lines 27-40).

6.   Claims 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Gronemeyer in view of Nagatani et al (US 2001/0005402; hereafter "Nagatani").

        Regarding claim 5, Gronemeyer discloses the limitations of claim 2 as applied

above. Gronemeyer does not disclose that in determining the phase of the phasor

having the maximum magnitude of all the elements of the matrix, only at most two

phasor values are held in a memory device at any instant of time, and of the two phasor

values, only the phasor value having the larger magnitude is saved in the memory

device before calculating a next phasor value. However, Nagatani discloses a

correlator which stores a maximum correlation and updates it by comparing a past

maximum correlation value by a current correlation value. In the case that the current

correlation value is greater than the past maximum correlation value, the past maximum

correlation value is replaced by the current correlation value (i.e. the new max.) (para.

0105). Therefore, it would have been obvious to one having ordinary skill in the art at

the time which the invention was made to utilize a memory device and method which

only stores the maximum correlation as taught by Nagatani in the method of

Gronemeyer because it could be advantageously be utilized to save memory.

        Regarding claim 10, Gronemeyer discloses the limitations of claim 7 as applied

above. Further, Gronemeyer discloses the remaining limitations of the claim as applied

to claim 5 above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Perilla whose telephone number is (571) 272-3055. The examiner can normally be reached on M-F 8-5 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Perilla
December 19, 2005

jmp

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER